

## ABSTRACT OF THE DISCLOSURE

A cleaning apparatus for removing contaminants from the surface of a substrate includes two parts: one which produces an aerosol including frozen particles and directs the aerosol onto the surface of the substrate to remove contaminants from the surface by physical force, and another part in which a fluid including a gaseous reactant is directed onto the surface of the substrate while the surface is irradiated to cause a chemical reaction between the reactant and organic contaminants on the surface, to chemically removing the organic contaminants. In the method of cleaning the substrate, the physical and chemical cleaning processes are carried out in a separate manner from one another so that the frozen particles of the aerosol are not exposed to the effects of the light used in irradiating the surface of the substrate. Therefore, the effectiveness of the aerosol in cleaning the substrate is maximized.